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Report From 1972 on

Volume-Weight of Sweet Cherries in Brine

J. H. Levin, ARS, USDA, East Lansing, Michigan

D. J. Sanderson, Food Inspection Division, Michigan Department of Agriculture

C. Hills, ARS, USDA, Philadelphia, Pennsylvania

W. Harrington, ARS, USDA, Philadelphia, Pennsylvania

Over 75 percent of the sweet cherries grown in Michigan are brined and processed into maraschino cherries. Most of the Michigan crop was harvested mechanically in 1972.

Research has shown that brining of machine harvested sweet cherries should be started within one hour after harvest for best quality. Some sweet cherries are now brined at orchards in the Pacific Northwest and in Michigan. Research also has shown that putting sweet cherries in brine in the orchard will facilitate the production of high quality brined cherries in Michigan.

A method of buying and selling tart cherries by volume was developed by the USDA, Michigan Department of Agriculture and MSU and is now used extensively in Michigan. Research in 1969, 1970, 1971 showed that buying sweet cherries suspended in a brine solution by volume was feasible and fair to both buyer and seller. In 1972 several companies bought some sweet cherries in brine by volume.

In 1972 at the request of the sweet cherry industry personnel of the Weights and Measures Section, Food Inspection Division of the Michigan Department of Agriculture and the U. S. Department of Agriculture, ARS, at MSU conducted studies to determine the weight-volume relationships of sweet cherries suspended in brine.

Kroupa Inc., Old Mission and Westfield - Summers, Fremont, cooperated in the studies. Vernon Kroupa and Robert Wolf of Kroupa and Bernard Zozz of Westfield - Summers made facilities available and offered suggestions. Some of the primary cooperating growers were John Shaw, John Minnema and Cal Jameson.

The pallet tanks used in the study were painted with a corrosion resistant material and all met Michigan Department of Agriculture's regulations for volume buying of cherries. The volume per inch of depth was clearly marked on each tank.

A pallet tank partially filled with brine was weighed on a scale which was calibrated and checked several times a day by a Weights and Measures Inspector of the Michigan Department of Agriculture. The tank was then moved to a mechanical harvester operating in a sweet cherry orchard within a 1/2 to 3 mile distance. The tank was filled with mechanically harvested cherries and returned to the scale. Continuous inspection made sure that no brine was spilled. The tank was re-weighed and net weight of cherries in the tank obtained.

The filled tanks were transported by truck to the processing plant. There MDA personnel as well as plant personnel obtained the depth of cherries by using a MDA regulation measur-

ing probe. Volume was easily calculated.

In the orchard while a pallet tank was being filled from the harvester a continuous random 5 pound sample of the cherries was obtained by putting a container under the harvester conveyor discharge every few seconds and obtaining a few cherries each time. Stem counts, soluble solids, and cherry size and specific gravity (determined by displacement of destemmed cherries in water) were obtained on each sample.

Results

Data were obtained from July 10 to July 28, 1972, on 177 pallet tanks containing 143,448 pounds of sweet cherries (Napoleons, Emperor Francis, Windsors, Golds) and a volume of 3497.196 cubic feet.

The important results are shown in Table 1.

An analysis of the data shows that:

1. Specific gravity (density) of the various varieties do not differ significantly. Varieties do differ in weight/volume in brine only because of different percentages of attached stems.

2. Ethrel does not significantly affect the specific gravity of cherries, however, it reduces the percentage of attached stems which effects weight/volume.

Table 1. 1972 SWEET CHERRY SURVEY

Variety	No. of 1/ Tanks	Average Weight Per Volume			Average Percent Stems			Average Specific Gravity		
		Ethrel	Non Ethrel	Total	Ethrel	Non Ethrel	Total	Ethrel	Non Ethrel	Total
Napoleons	53	43.287	43.532	43.348	12.8	17.7	14.0	1.0519	1.0553	1.0528
Windsors	50	42.857		42.857	26.1		26.1	1.0329	0.0000	1.0329
Goldsens	4	42.887		42.887	8.7		8.7	1.0343	0.0000	1.0343
Emp Frans	70	38.589		38.589	53.6		53.6	1.0319	0.0000	1.0319

1/ Each tank held 800-1000 lbs. of cherries.

3. A change in soluble solids (percent sugar) of 3 percent will change specific gravity 1 percent. However, soluble solids can be correlated with attached stems and therefore the effect of soluble solids is included in effect of attached stems on weight/volume.

4. Size of fruit and/or type brine does not significantly affect weight/volume of sweet cherries in brine.

5. Attached stems significantly affect weight/volume in brine.

This confirmed research of 1969, 1970 and 1971.

Recommendations

It is recommended that no correction be made for attached stems and that an average weight/volume figure be used for the year and it be the same for each variety. Reasons for these recommendations are:

1. It is impossible to obtain accurate stem counts by sampling

a pallet tank and errors in sampling would be far greater than using an average weight/volume and or stem count.

2. Making a correction for each pallet tank according to stem count would result in mathematical errors, more paper work and other errors.

3. Growers deliver over a 10 day or longer period and stem counts and weight/volume will average out.

4. Approximately 60 percent of the cherries are Napoleons (having smallest stem counts and highest weight/volume), and since most growers have more than one variety the "one" figure will be accurate or slightly in favor of the grower. If a grower has more than 60 percent

Naps he might be at a slight disadvantage of at the most .1 or .2 percent (200 to 400 lbs. in 100 ton).

The weighted average weight/volume figure for 1972 is 42.83 based on the Michigan production of approximately 60 percent Naps, 25 percent Windsors, 7.5 percent Emperor Francis and 7.5 percent Golds. The average stem count based on the same variety distribution is 19.6.

The industry used 43 lb/cu foot for purposes of converting volume to weight in 1972. This figure should not change significantly in 1973. Greater use of ethrel may reduce stem counts and therefore more research on stem counts should be conducted in 1973.